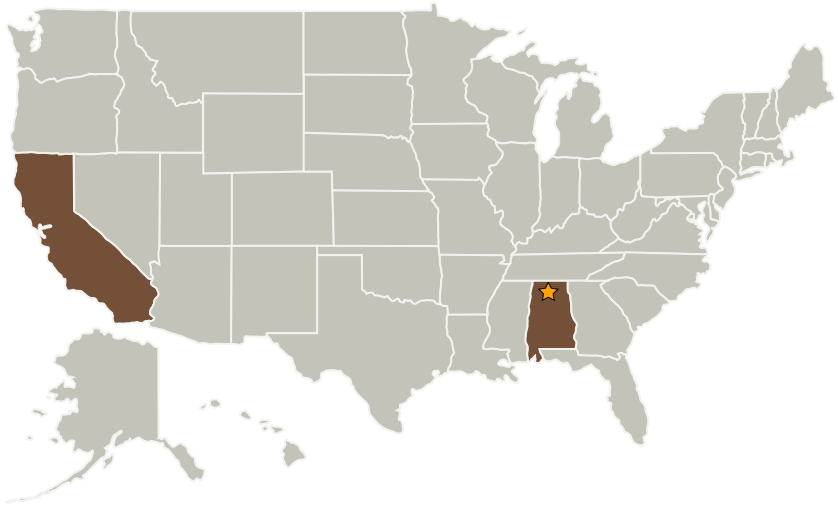
FCAPD Protective Coating for Space Tethers, Phase I

Completed Technology Project (2007 - 2007)

Project Introduction

Alameda Applied Sciences Corporation (AASC) proposes to demonstrate extended service lifetime of space tethers in the Low Earth Orbit (LEO) environment by using Filtered Cathodic Arc Plasma Deposition (FCAPD) to deposit a high quality protective coating onto space tether material. Protective coatings deposited by FCAPD have low defect density, excellent adhesion to space tether material, low mass and thickness and have been shown in initial laboratory tests to protect against atomic oxygen (AO) erosion on Kapton as well as Zylon. Because of the low process temperature (<80 oC), FCAPD can minimize the thermal effects the process has on the tether material, which is believed to be a major disadvantage of current types of protective coatings such as Photosil , TOR-LM and POSS. These polymer coatings offer a level of protection against AO and UV damage, but at a significant cost to the tether's tensile strength .

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Marshall Space Flight Center (MSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Marshall Space Flight Center(MSFC)	Lead Organization	NASA Center	Huntsville, Alabama
Alameda Applied Sciences Corporation	Supporting Organization	Industry Minority-Owned Business	San Leandro, California

Primary U.S. Work Locations	
Alabama	California

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.4 Advanced Propulsion
    - TX01.4.2 Electromagnetic Tethers